REMARKS

Claims 1-36 are all the claims pending in the application. All the claims stand presently rejected under 35 U.S.C. § 112, second paragraph. In addition, claims 1 and 2 are rejected under 35 U.S.C. § 102(b) as being anticipated by Takano et al. (US Patent No. 5,710,847), and claims 3-36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Takano et al. in view of Fig. 17 of the present application. Further, claim 36 and the drawings are objected to. By this Amendment, Applicant amends claims 33, 34, and 36 for non-substantive reasons.

The Objection to Claim 36 and to the Drawings

Regarding the objection to claim 36, Applicant has amended the claim pursuant to "Acceptable Multiple Dependent Claim Wording" under MPEP § 608.01(n)I.A. Therefore, Applicant respectfully requests withdrawal of the objection to claim 36.

Regarding the objection to Figures 17, 18, 19A, and 19B, Applicant has labeled these Figures as "Prior Art". Thus, Applicant respectfully requests withdrawal of the objection to the drawings. A "Request for Approval of Proposed Drawing Corrections" is enclosed.

The Rejection of Claims 1-36 under 35 U.S.C. § 112, second paragraph

The grounds of rejection in item 5 of the present Office Action state that "Claim 1 recites elements of the laser light source but fails to provide all the connections and structural

relationships to properly conform the laser apparatus. For example, claim 1 recites a wavelength selector, but the claim fails to provide any structural relationships between the wavelength selector and the other elements of the system."

Claim 1 is directed to a laser light source, which comprises, among other things, "a semiconductor light-emitting device for emitting light", and "an external resonator including a wavelength selector which selects a wavelength of said light", wherein "one end facet of said semiconductor light-emitting device has a coating which becomes an antireflection coating with respect to the selected wavelength" (emphasis added).

Thus, claim 1 reflects the subject matter that the wavelength selector selects a wavelength of the light emitted by the semiconductor light-emitting device. Claim 1 also reflects the subject matter that one end facet of the semiconductor light-emitting device has a coating, which becomes an antireflection coating with respect to the wavelength that is selected by the wavelength selector for the light emitted by the semiconductor light-emitting device. Therefore, Applicants submit that claim 1 reflects sufficient relationships between different elements of the claim so as to satisfy the requirements of 35 U.S.C. § 112, second paragraph. In particular, claim 1 reflects sufficient relationships between the wavelength selector and the semiconductor light-emitting device.

Further, the grounds of rejection state that "[t]he wording of claims 33-35 is vague and confusing, and Examiner is unsure of what is claimed." However, the Examiner did not specify, which of the words in claims 33-35 are allegedly vague and confusing. Therefore, Applicant

assumes that the wording "longitudinal mode width", "multi-longitudinal mode", "high-frequency superposition" are not understood by the Examiner.

Applicant submits that "longitudinal mode width", "multi-longitudinal mode", and "high-frequency superposition" are terms of the art, which are readily understood by a person skilled in the art.

First, Applicant attaches definitions of "superposition principle", as found in the *McGraw-Hill Encyclopedia of Science & Technology* and in *Webster's Third New International Dictionary*. In addition, Applicant attaches a definition of "mode", as found in *Webster's Third New International Dictionary*.

Second, a search on www.yahoo.com for "superposition" and "multi-longitudinal mode width" reveals numerous documents that are readily available on the World Wide Web for a person skilled in the art or even the public at large. Examples of such documents are attached.

Third, Applicant refers the Examiner to the specification at, e.g., page 21, last paragraph (which bridges over to page 22); page 26, first full paragraph; page 35, first paragraph and second paragraph (which bridges over to page 36); page 41, last paragraph (which bridges over to page 42); and page 43, second full paragraph and last paragraph (which bridges over to page 44), which discuss the above-mentioned various terms recited in claims 33-35.

Should the Examiner still maintain the objection to claims 33-35, Applicant respectfully requests the Examiner to point out which specific terms in the claims are considered to be vague and confusing, and why these terms are considered to be vague and confusing.

The Claim Rejections under 35 U.S.C. §§ 102 and 103

Fig. 6 of the application shows a laser light source constructed according to an exemplary embodiment of the present invention. More specifically, Fig. 6 shows a semiconductor laser chip 10, a waveguide-type wavelength selector 20, and an optical waveguide device 130.[1]

A stripe 12 of the semiconductor laser chip 10 is formed oblique to front and rear facets 10b, 10a of the semiconductor laser chip 10. A channel type optical waveguide 132 is also formed oblique to a rear facet 130b thereof. On the other hand, a front facet 130a of the optical waveguide device 130 is cut perpendicular to the channel type optical waveguide 132 so that the light reflected at the front facet 130a turns back in the direction opposite to the traveling direction of the light.[2]

Under appropriate biasing conditions, light with a center wavelength of 1060 nm is emitted from the front facet 10b and the rear facet 10a of the semiconductor laser chip 10 in both directions. The light emitted from the rear facet 10a of the semiconductor laser chip 10 is incident on the optical waveguide 22 of the wavelength selector 20 and travels through the

[1] See application text, page 26, ln. 12-22

[2] See application text, page 27, ln. 9-20

optical waveguide 22. The light is reflected within DBR grating 23 and is returned to the semiconductor laser chip 10. While this is occurring, a wavelength of the light that is reflected is selected by the wavelength selection operation of the DBR grating 23. On the other hand, the light emitted from the front face 10b of the semiconductor laser chip 10 is incident on the optical waveguide 132 of the optical waveguide device 130 and travels through the optical waveguide 132. A portion of the light is reflected at the front facet 130a of the optical waveguide device 130 and is returned to the semiconductor laser chip 10.[3]

The laser beam 11 resonates between the DBR grating 23 of the wavelength selector 20 and the front facet 130a of the optical waveguide device 130, and a portion of the laser beam 11 is emitted from the front facet 130a of the optical waveguide device 130. The rear facet 10a of the semiconductor laser chip 10 and the front facet 20a of the wavelength selector 20 have AR (anti-reflection) coatings, respectively. In addition, the front facet 10b of the semiconductor laser chip 10 and the rear facet 130b of the optical waveguide device 130 also have AR coatings.[4]

Independent claim 1 is directed to a laser light source, which comprises, among other things, a semiconductor light-emitting device for emitting light; an external resonator including a wavelength selector, which selects a wavelength of said light; wherein one end facet of the

[3] See application text, page 28, ln. 17, to page 29, ln. 8

[4] See application text, page 29, ln. 9-26

semiconductor light-emitting device, which does not constitute the external resonator, has a coating which becomes an antireflection coating with respect to the selected wavelength.

Independent claim 1 is one of the claims presently rejected under 35 U.S.C. § 102(b) in view of the Takano reference. The grounds of rejection refer to the paragraph in col. 2, ln. 25-50, of the reference, which discusses aspects of Fig. 14(a) and Fig. 14(b).

Fig. 14(a) shows a window structure for decreasing facet reflectivity of a semiconductor optical functional device 30 (e.g., a semiconductor laser) by forming a window region 32 made of a material with a band gap larger than that of an active region 31 between a facet of the active region 31 and a device facet 35. Propagated light 34 passing through a waveguide 33 in the active region 31 is emitted from the facet of the active region 31 as a laser beam. Because the window region 32 serves as a transparent region absorbing no laser beam, the laser beam is propagated up to the device facet 35, which serves as a reflection surface. The reflected light 37 reverses its traveling direction and is propagated toward the active region 31 while increasing the beam spot size. Therefore, the reflectivity defined by the overlap integral of an incoming beam and a reflected beam is decreased because the beam diameter is increased. Moreover, in Fig. 14(a), symbol 40 represents a lens for converting the transmitted light 36 of the expanded incoming imperfect spherical wave into parallel rays; the symbol 50 represents a flat end fiber whose incident facet is flat; symbol 51 represents a clad of fiber; and symbol 52 represents a core

of the fiber; and solid lines at equal intervals in the core represent plane waves of the light passing through the core.[5]

Col. 2, ln. 25-50, cited in the grounds of rejection, merely address various problems that are caused by the above-discussed arrangement of Fig. 14(a). However, there is no teaching or suggestion in col. 2, ln. 25-50, or, for that matter, in any other part of the Takano reference of an external resonator including a wavelength selector, which selects a wavelength of light emitted by a semiconductor light-emitting device; wherein one end facet of the semiconductor light-emitting device, which does not constitute the external resonator, has a coating which becomes an antireflection coating with respect to the selected wavelength, as recited in claim 1.

In fact, the grounds of rejection refer only generally to Figure 1 and to col. 2, ln. 25-50, of the reference, without stating where specifically each and every element of claim 1 is allegedly taught or suggested.

For at least these reasons, Applicant submits that claim 1 is patentable over the prior art made of record. The dependent claims 2-36 are patentable at least by virtue of their dependency from claim 1.

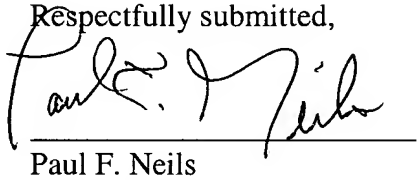
[5] See Takano reference, col. 1, ln. 21-51

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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Date: April 14, 2003

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

33. (Amended) The laser light source as set forth in claim 1, wherein

a longitudinal mode width of said external resonator is less than the width of the wavelength selected by said wavelength selector; and

said laser light source is operated in a multi-longitudinal mode which is within the width of said selected wavelength by ~~said~~ high-frequency superposition.

34. (Amended) The laser light source as set forth in claim 30, wherein

a longitudinal mode width of said external resonator is less than the width of the wavelength selected by said wavelength selector; and

said laser light source is operated in a multi-longitudinal mode which is within the width of said selected wavelength by ~~said~~ high-frequency superposition.

36. (Amended) The laser light source as set forth in any one of the preceding claims ~~1-35~~, further comprising temperature control means for maintaining the devices, which constitute said external resonator, at a predetermined temperature.